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## NOTICE OF ALLOWANCE AND FEE(S) DUE

27130 7590 03/11/2004  
EITAN, PEARL, LATZER & COHEN ZEDEK LLP  
10 ROCKEFELLER PLAZA, SUITE 1001  
NEW YORK, NY 10020

EXAMINER	
TORRES, JOSEPH D	
ART UNIT	PAPER NUMBER
2133	7
DATE MAILED: 03/11/2004	

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/978,165	10/17/2001	Ilan Adar	P-4451-US	4200

TITLE OF INVENTION: TWO-DIMENSIONAL INTERLEAVING IN A MODEM POOL ENVIRONMENT

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$665	\$300	\$965	06/11/2004

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

### HOW TO REPLY TO THIS NOTICE:

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If the SMALL ENTITY is shown as NO:

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B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check the box below and enclose the PUBLICATION FEE and 1/2 the ISSUE FEE shown above.

☐ Applicant claims SMALL ENTITY status.  
See 37 CFR 1.27.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER:** Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

## PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail**

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27130 7590 03/11/2004

**EITAN, PEARL, LATZER & COHEN ZEDEK LLP**  
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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

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nonprovisional	YES	\$665	\$300	\$965	06/11/2004

EXAMINER	ART UNIT	CLASS-SUBCLASS
TORRES, JOSEPH D	2133	714-762000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1	_____
2	_____
3	_____

## 3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the USPTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent); ☐ individual ☐ corporation or other private group entity ☐ government

## 4a. The following fee(s) are enclosed:

- ☐ Issue Fee
- ☐ Publication Fee
- ☐ Advance Order - # of Copies \_\_\_\_\_

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- ☐ A check in the amount of the fee(s) is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

Director for Patents is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

(Authorized Signature)

(Date)

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Alexandria, Virginia 22313-1450.

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27130	7590	03/11/2004	EXAMINER TORRES, JOSEPH D	
EITAN, PEARL, LATZER & COHEN ZEDEK LLP 10 ROCKEFELLER PLAZA, SUITE 1001 NEW YORK, NY 10020			ART UNIT 2133	

DATE MAILED: 03/11/2004

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 438 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 438 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) system (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (703) 305-1383. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

**Notice of Allowability**

Application No.

09/978,165

Examiner

Joseph D. Torres

Applicant(s)

ADAR ET AL.

Art Unit

2133

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Paper No. 6 filed 13 February 2002.
2. ☒ The allowed claim(s) is/are 1-57.
3. ☐ The drawings filed on \_\_\_\_\_ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
  - \* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 7.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 6
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
ALBERT DECADY  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: '402' in Figure 4B. Corrected drawings or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Allowable Subject Matter***

2. Claims 1-57 are allowed.

The following is an Examiner's statement of reasons for the indication of allowable subject matter:

The present invention pertains to a method for interleaving a plurality of data frames for transmission via a plurality of modems in a modem pool, where each of said data frames includes a plurality of code words having a predefined level of error correction.

Claim 1 recites various features:

"assigning said plurality of data frames to a corresponding plurality of modem time frames, wherein a plurality of code word symbols in each of said data frames is assigned to a plurality of time slots in said modems in said corresponding time frames

such that said predefined level of error correction is sufficient to correct error or loss caused to any of said symbols given a predefined level of modem loss or malfunction; and moving any of said code word symbols assigned to one of said time frames to another of said time frames such that said predefined level of error correction is sufficient to correct error or loss caused to any of said symbols given a predefined level of cross-modem error burst while preserving said predefined level of error correction sufficient to correct error or loss caused to any of said symbols given said predefined level of modem loss or malfunction”.

The Prior Art of record, and in particular Furuta; Akihiro et al. (US 6598198 B1, hereafter referred to as Furuta), teach a method for interleaving a plurality of data frames for transmission via a plurality of modems in a modem pool (see Figure 2 and 9 in Furuta; Note: col. 7, lines 62-67 in Furuta teach that various OFDM sub-carriers are used to transport transmission frames; the mechanism for modulating the various OFDM sub-carriers is a modem pool since the Authoritative Dictionary of IEEE Standards Terms defines modem as a modulator-demodulator device and each of the sub-carriers requires a separate means for modulating and demodulating onto the sub-carrier frequency band), where each of said data frames includes a predefined level of error corrections (col. 1, lines 15-20 in Furuta teach that each of said data frames includes a predefined level of error corrections). The prior art however are not concerned with and do not teach a method whereby “each of said data frames includes a plurality of code words having a predefined level of error correction the method comprising: assigning said plurality of data frames to a corresponding plurality of

modem time frames, wherein a plurality of code word symbols in each of said data frames is assigned to a plurality of time slots in said modems in said corresponding time frames such that said predefined level of error correction is sufficient to correct error or loss caused to any of said symbols given a predefined level of modem loss or malfunction; and moving any of said code word symbols assigned to one of said time frames to another of said time frames such that said predefined level of error correction is sufficient to correct error or loss caused to any of said symbols given a predefined level of cross-modem error burst while preserving said predefined level of error correction sufficient to correct error or loss caused to any of said symbols given said predefined level of modem loss or malfunction" as taught by claim 1. Hence the prior art taken alone or in any combination fail to teach the claimed novel feature in claim 1. Claims 20 and 39 recite substantially the same language as in claim 1. Claims 2-9, 21-28 and 40-47 depend from respective claims 1, 20 and 39.

Claim 10 recites various features:

"assigning said plurality of data frames to a corresponding plurality of modem time frames, wherein a plurality of code word symbols in each of said data frames is assigned to a plurality of time slots in said modems in said corresponding time frames such that said predefined level of error correction is sufficient to correct error or loss caused to any of said symbols given a predefined level of modem loss or malfunction; constructing a matrix having a plurality of rows and columns, each row comprising a different one of said data frames and each column corresponding to one of said

modems via which said code word symbols in said column are assigned; and changing the order of the code word symbols in any of the columns of said matrix such that said predefined level of error correction is sufficient to correct error or loss caused to any of said symbols given a predefined level of cross-modem error burst while preserving said predefined level of error correction sufficient to correct error or loss caused to any of said symbols given said predefined level of modem loss or malfunction”.

The Prior Art of record, and in particular Furuta; Akihiro et al. (US 6598198 B1, hereafter referred to as Furuta), teach a method for interleaving a plurality of data frames for transmission via a plurality of modems in a modem pool (see Figure 2 and 9 in Furuta; Note: col. 7, lines 62-67 in Furuta teach that various OFDM sub-carriers are used to transport transmission frames; the mechanism for modulating the various OFDM sub-carriers is a modem pool since the Authoritative Dictionary of IEEE Standards Terms defines modem as a modulator-demodulator device and each of the sub-carriers requires a separate means for modulating and demodulating onto the sub-carrier frequency band), where each of said data frames includes a predefined level of error corrections (col. 1, lines 15-20 in Furuta teach that each of said data frames includes a predefined level of error corrections). The prior art however are not concerned with and do not teach a method whereby “each of said data frames includes a plurality of code words having a predefined level of error correction, the method comprising: assigning said plurality of data frames to a corresponding plurality of modem time frames, wherein a plurality of code word symbols in each of said data frames is assigned to a plurality of time slots in said modems in said corresponding time

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frames such that said predefined level of error correction is sufficient to correct error or loss caused to any of said symbols given a predefined level of modem loss or malfunction; constructing a matrix having a plurality of rows and columns, each row comprising a different one of said data frames and each column corresponding to one of said modems via which said code word symbols in said column are assigned; and changing the order of the code word symbols in any of the columns of said matrix such that said predefined level of error correction is sufficient to correct error or loss caused to any of said symbols given a predefined level of cross-modem error burst while preserving said predefined level of error correction sufficient to correct error or loss caused to any of said symbols given said predefined level of modem loss or malfunction" as taught by claim 10. Hence the prior art taken alone or in any combination fail to teach the claimed novel feature in claim 10.

Claims 29 and 48 recite substantially the same language as in claim 10.

Claims 11-19, 30-38 and 49-57 depend from respective claims 10, 29 and 48.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

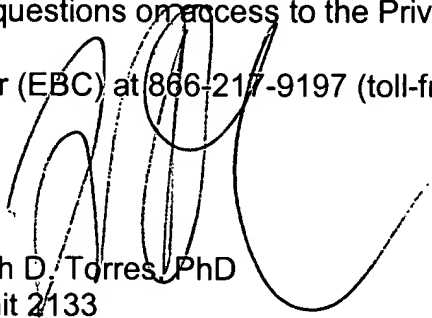
***Conclusion***

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wright; David A. et al. (US 6366776 B1) teaches and coordination between the uplinks and downlinks for communication satellite systems. Pirez; Didier et al. (US 5572548 A) teaches a method of coherent modulation and demodulation for HF (high frequency) data transmission at a high bit rate. Friedman; Vladimir et al. (US 5983388 A) teaches forward error correction (FEC) arrangement for multipoint to single point communication systems such as discrete wavelet multitone (DMT(DWMT)) systems and time division multiplexed (TDM) systems. Pecen; Mark Edward et al. (US 6424637 B1) teaches synchronization of a mobile station during handover between a third generation communication system and the Global System for Mobile Communications system. Wong; Wing Tak Kenneth et al. (US 5983174 A) teaches digitally coded speech signals. Yamanaka; Ryutaro (US 6065149 A) teaches an error correction device suitable for a communication system using a concatenated code. Sadanaka; Nobuyuki (US 5400305 A) teaches an audio visual information signal reproducing apparatus for reproducing an audio visual information signal of the MUSE (Multiple Sub-Nyquist Sampling Encode) system, which is a transmission system for high definition television. Pommier; Daniel et al. (US 5191576 A) teaches broadcasting of digital data designed to be received notably by moving receivers in an urban environment, namely in the presence of interferences or jamming, under conditions of multiple propagation (RAYLEIGH process) generating a phenomenon of fading. Voith; Raymond P. et al. (US 5636224 A) teaches a method and apparatus for interleave/de-

interleave addressing in data communication circuits. McCourt, P.M.; Kaouri, H.A.; Transform coding at 4.8 kbit/sec using interleaving of transform frames and dual gain-shape vector quantization, IEEE International Conference on Acoustics, Speech, and Signal Processing, Volume: 2, 27-30 April 1993, Pages: 624 – 627.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (703) 308-7066. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (703) 305-9595. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Joseph D. Torres, PhD  
Art Unit 2133



ALBERT DECADY  
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